STUDY OF THE TUMORIGENICITY OF HUMAN ADIPOSE MESENCHYMAL STEM CELLS

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Introduction: Mesenchymal stem cells (MSCs) derived from adipose tissue, bone marrow, cord blood, and other tissues, have recently attracted much attention as potential therapeutic agents in various diseases due to their differentiation quality. The adipose tissue is more accessible and safe for the donor to isolate mesenchymal stem cells (MSC). In vitro, adipose mesenchymal stem cells (AMSC) can be differentiated into cells such as adipocytes, chondrocytes, and osteocytes. All of this ability, with their strong immunosuppressive effects, makes AMSCs attractive candidates for cell therapy. The objective of this study was to assess the capacity of AMSC to contribute tumor pathogenesis by supporting tumor microenvironments and increasing tumor growth in experimental mice models in vivo.

Methods: The culture of MSC was derived from the adipose tissue provided by the Research Institute of Traumatology and Orthopedics (Astana, Kazakhstan). Cell cultivation took place at 37°C with a content of 5% CO2 in a complete AlphaMEM medium. Nude mice (Swiss Nu/Nu strain), provided by the Department of Experimental Radiation Oncology Breeding Core, The University of Texas MD Anderson Cancer Center. An experiment group of four weeks Nude mice were injected by 3 mln AMSC the control group was injected with 3 mln tumorigenic myeloma cells of the MDA-MB-231 in 200 ul phosphate saline buffer subcutaneously.

Results: Surveillance was carried out every 5-7 days. The control group had large tumors with metastases and according to the institutional protocol, the group was exposed to euthanasia with inhalation of carbon dioxide after 26 days. Tumors were not observed in the lymph nodes and parenchymatous bodies in the experimental group mice. According to the evaluation criteria, tumorigenicity in the experimental group of tumor development was not found, whereas in the control group the development of tumors was 100%. The latent period of tumor formation in the control group was 10 days.

Conclusion: In the course of the experiment, it was found that mesenchymal stem cells derived from human adipose tissue have not tumorigenic potential and can be considered in research for regenerative medicine.